Mapping Of Traditional Medicinal Plants in Pugo, La Union

Flordiliza B. Dalumay,
Associate Professor, College of Education, Don Mariano Marcos Memorial State University-South La Union Campus, Philippines

ABSTRACT

The study determined the species of traditional medicinal plants, including local and scientific names that thrive under different land use of the municipality of Pugo; the physical environment of traditional medicinal plants; the relationship of plant density and physical environment; develop mapping procedure for different land-use; and develop a GIS map of traditional medicinal plants in the municipality of Pugo. Several instruments were used in the study namely, thermometer, pH meter, and Geographical Positioning System (GPS). All data gathered were analyzed using SPSS. The study came up with the following findings: The municipality of Pugo has diverse medicinal plants across the different land-use types of Pugo, La Union. The physical environment of the study site is just right for plants to survive. There exists no significant relationship between density of medicinal plants to that of elevation, temperature, rainfall, and soil organic matter. The higher is the potassium and phosphorus level of the soil, the higher is the density of medicinal trees.

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Introduction

Since time immemorial, people have gathered plant resources for various uses such as medicines and cosmetics, to name a few. The increasing human needs and commercial trade of wide variety of plant species due to their healing properties causes plant exploitation. The loss of plant’s genetic resources at an increasing rate may be due to lack of knowledge regarding the importance of these plants, and deforestation. Likewise, with the increasing extinction of plant species, food security is threatened.

As a response, a number of agencies are recommending that wild species be cultivated and conserved systems to sustain a gene bank and herbarium which are components in technology generation and utilization process. The University of the Philippines at Los Banos (UPLB), who is in the forefront of
propagation and cultivation of several medicinal plants to supply the needs of research, maintains a 0.90 ha gene bank for medicinal plants with 300 different species.

Accordingly, the National Institute of Science and Technology (NIST), the Philippine Council for Health Research and Development (PCHRD) and the University of the Philippines (UP) are now working out a mass processing of plants whose effectiveness could be just as on their natural forms, direct from the garden or backyard. Finding a medicine is a continuous research activity and a continuing challenge that may eventually address a remedy for the even dreaded diseases.

For its part, the Don Mariano Marcos Memorial State University (DMMMSU), Agoo, La Union, has started determining the anti toxicity and chemical characteristics of indigenous medicinal plants present in its nearby municipalities. The Department of Science and Technology (DOST), on the other hand, considered the use of these plants as alternative of commercial medicine.

For one, the immediate benefits via immediate cash for daily subsistence are imperative. Conservation of genetic resources alone may not be an effective motivation to save the plants. According to Abalos (2003), 30% of the 41 plants that were considered in her study are marketable. Propagation and conservation of marketable medicinal plants while providing for the basic needs of the disadvantaged sector of the community is one way to operationalize the concept of sustainable development where it stresses the need to satisfy society’s needs and the carrying capacity of ecosystems.

Conservation and production/propagation of indigenous medicinal plants are components in the process of making these plants available to the public in terms of drugs and other forms. It is in this context that the study was conceptualized.

Consequently, information inputs about what has been done and what needs to be done are requirements in coming up with research programs, and in the formulation of policies that are relevant to the solution of an urgent problem.

Also, since most of the researches conducted are on the documentation of medicinal plants in the national level, data gaps at regional or local level exist.

The general objective of the study was to determine the density and geographical distribution of traditional medicinal plants in the municipality of Pugo with the following specific objectives:

1. Determine the species of traditional medicinal plants, including local and scientific names, that thrive under different land use of the municipalities of Pugo;
2. Determine the physical environment of traditional medicinal plants;
3. Determine the relationship of plant density and physical environment;
4. Develop mapping technologies for different land-use in Region 1; and
5. Develop a GIS map of traditional medicinal plants in the municipality of Pugo.

**Methodology**

**The Study Site**

Pugo is geographically situated between 16° 23°10’ and 16° 14° 15’ north latitudes and 120° 26° 40’ and 120° 31° 30’ east longitudes.

It has an approximate administrative land area of 8,711.75 hectares.
Location and extent of the three barangays

Study Design

The design of the study is descriptive. The quantitative design was used since the following quantitative variables were determined: plant density of each medicinal plant, soil characteristics (ph, organic matter, potassium, and phosphorus available); and physical environment (elevation, rainfall, and temperature) of the area/place where the medicinal plants thrive. These quantitative variables were included in GIS map, an output of the study; and was used to determine the relationship of plant density and the physical environment; and to describe the study areas (barangays).

A 20% sampling intensity was used in this study. Out of the fourteen (14) barangays in Pugo, only three (3) barangays namely Cuenca, Duplas, and Palina were considered based from geographical location.

Three (3) land use types namely residential, agricultural, and forest/agro forest were identified in each of the three barangays.

Following the 20% sampling intensity, only 66 households were surveyed in the residential area of Barangay Cuenca, 22 in Barangay Duplas, and 32 in Barangay Palina.

For the agricultural and forest/agro forest land use types, strip cruise method was used in establishing sample plots. Each strip has a dimension of 100m x 20m covering an area of 2000 m². All trees with medicinal value within the strip were identified and counted. Inside this area, a 5m x 5m (25 m²) plot was established for the identification and inventory of shrubs medicinal plants. A 1m x 1m plot was established inside the 5m x 5m plot for the identification and inventory of grasses, herbs, or vines medicinal plants. Figure 2 shows how strip method was established in the field.

Figure 2. Sampling layout based on strip cruise method.
For agricultural land use type, a total of sixteen (16) strips were established in Barangay Cuenca, fourteen (14) strips in Barangay Duplas, and fifteen (15) strips in Barangay Palina. For the forest / agro forest land use types, a total of thirteen (13) strips were established in Barangay Cuenca, nine (9) in Barangay Duplas, and thirty-five (35) strips were surveyed in Barangay Palina.

Prior to the collection of data, consultations from experts were done. Courtesy call to the municipal mayor of Pugo, La Union, Hon. Noemi Balloguing and barangay officials was done before the conduct of the study. For the residential-land-use type, the team surveyed the households by a short interview to community respondents for the presence of medicinal plants. For agricultural and agro-forest land-use types, strip cruise method was employed. Members of the team were divided to get data from the different land-use types. All medicinal plants identified were counted regardless of its height. Unidentified medicinal plants were collected and studied for correct identification by the aid of a forester and laboratory aides.

Soil samples were taken from each strips and were analyzed at DMMMSU-NLUC, Soil Laboratory as to pH, organic matter, potassium and phosphorus.

Several instruments were used in the study. A GPS (Geographical Positioning System) kit was used to get the exact elevation of the area under study. A soil tester was used to get the pH and moisture content of the soil and a thermometer to get the temperature of the area.

Frequency counts, ranking, and correlation were used in the study. Data gathered were analyzed using the Statistical Package for Social Sciences (SPSS) computer software.

Results and Discussion

There were ninety-eight (98) species of trees, thirty-three (33) species of shrubs, and seventy-one (71) species of herbs found in the three barangays of Pugo, La Union. The Geographical Positioning System (GPS) was used to get the elevation of each study site. The average elevation being surveyed in Cuenca is 162, 203 in Duplas, and 211 in Palina. Rainfall is the most important climatic element in the country. The value for rainfall was taken during the coverage of the study period (April-June 2008) from PAGASA, Baguio City which is 110mm. The average temperature for the three barangays is 32 degrees centigrade. The soil pH is acidic (6). Soil pH affects the availability of nutrients in the soil. Majority of the food crops prefer a neutral or slightly acidic soil. The organic matter present in the soil ranges from 2.4 to 3.3. Organic matter increases the amount of water a soil can hold for plant growth. The amount of potassium and phosphorus elements in the soil is higher in Duplas than in the two barangays.

<p>| Table 1 Correlation coefficient of the medicinal plant density and physical environment |
|---------------------------------|-------|-------|-----------------|-----------------|-----------------|-----------------|</p>
<table>
<thead>
<tr>
<th>Density</th>
<th>Elevation</th>
<th>Temp</th>
<th>pH</th>
<th>Organic Matter</th>
<th>Phosphorus</th>
<th>Potassium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trees</td>
<td>0.283</td>
<td>-0.071</td>
<td>-0.602</td>
<td>0.369</td>
<td>0.918**</td>
<td>0.857*</td>
</tr>
<tr>
<td>Shrubs</td>
<td>0.878</td>
<td>-0.759</td>
<td>-0.831*</td>
<td>0.805</td>
<td>0.507</td>
<td>0.374</td>
</tr>
<tr>
<td>Herbs/vines</td>
<td>-0.059</td>
<td>-0.103</td>
<td>-0.597</td>
<td>0.418</td>
<td>0.536</td>
<td>0.568</td>
</tr>
</tbody>
</table>

Legend:  
**= Correlation at 0.01 level (2-tailed)  
*=Correlation at 0.05 level (2-tailed)

There is no significant relationship that exists between the plant density of trees, shrubs and herbs/vines to the elevation, temperature and organic matter. This further means that whatever is the location, temperature of the environment, and the amount of organic substances present in the soil, there is no effect on the mass of plants. However, there is significant relationship that exists between the density of shrubs to that of soil pH. There is also significant relationship between the density of trees to the amount of phosphorus and potassium in the soil. The role of potassium in the plant is indirect, meaning that it does not make up any plant part. Instead, it acts as a catalyst regulating...
enzymatic processes in the plant that are necessary for plant growth. Potassium is important for a plant’s ability to withstand extreme cold and hot temperatures, drought and pests. (Ball, 2004). Phosphorus is an essential element classified as a macronutrient because of the relatively large amounts of P required by plants. Phosphorus is one of the three nutrients generally added to soils in fertilizers.

CONCLUSIONS AND RECOMMENDATIONS

The general objective of the study was to determine the density and geographical distribution of traditional medicinal plants in the municipality of Pugo with these specific objectives: determine the species of traditional medicinal plants, including local and scientific names, that thrive under different land use of the municipalities of Pugo; determine the physical environment of traditional medicinal plants; determine the relationship of plant density and physical environment; develop mapping technologies for different land-use in Region 1; and develop a GIS map of traditional medicinal plants in the municipality of Pugo. Several instruments were used in the study namely, thermometer, pH meter, and Geographical Positioning System (GPS) instrument. Frequency counts, ranking and the used of SPSS were considered in the study.

Conclusion
1. There are numerous medicinal plants that thrive in the different land-use types of Pugo, La Union.
2. The physical environment of the study site is just right for plants to survive.
3. There exists no relationship between density and elevation, temperature, rainfall, and organic matter.
4. Potassium and phosphorus significantly affect the density of trees.
5. Soil pH has significant effect to the density of shrubs.

Recommendations
1. Follow-up study should be conducted to completely map the medicinal plants that thrive in the municipality of Pugo, La Union.
2. Adopt the technology in mapping medicinal plants in agricultural and agro-forest/forest land-use types.

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